DOCUMENT RESUME

ED 348 099 JC 920 395

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TITLE Success, Competency, and Persistence of New College Students in Math 310 at SJCC by Method of Instruction, Fall 1990. Research Report #126.
INSTITUTION San Jose/Evergreen Community Coll. District, San Jose, CA.
PUB DATE Feb 92
NOTE 15p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Persistence; *Achievement Gains; Arithmetic; Community Colleges; Comparative Analysis; Conventional Instruction; Learning Laboratories; Mathematics Achievement; *Mathematics Instruction; Mathematics Skills; *Remedial Mathematics; Skill Centers; Student Characteristics; *Teaching Methods; Two Year Colleges; Two Year College Students
IDENTIFIERS *San Jose City College CA

ABSTRACT

A study was conducted at San Jose City College (SJCC) to determine whether method of instruction in Math 310 (Arithmetic) affected new college students' rates of success, first-semester competency, and persistence. The three instructional approaches used in Math 310 were a traditional three-unit classroom (CL); a structured math lab offering variable units at a fixed time with one full-time instructor (SL); and a multi-subject, learning center-based approach offering variable units by arrangement (LSC). Study participants included 163 new students starting at SJCC in fall 1990. Of these students, 78% were under 30 years of age; 39% were White, 33% Hispanic, 15% Black, and 9% Asian; and 55% were female. Study findings included the following: (1) 72 (44%) of the 163 students enrolled in Math 310 in fall 1990 achieved a level of competence their first semester that would allow them to progress to beginning algebra; (2) 72 (44%) of the Math 310 students persisted to the second semester; (3) CL students reached competency at a higher rate (64%) than SL students (46%) or LSC students (28%), though SL persisted at a higher rate (55%) than both LSC (38%) and CL students (31%); (4) 64% of the CL students were successful versus 92% of the SL students; and (5) 74% of the LSC students were successful, although only 10% were successful at the full three-unit credit level. Data tables, graphs, and recommendations are included. (JMC)

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By Kathleen Budros and Jon Kangas

- A TITLE III PROJECT -

San Jose/Evergreen Community College District

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FEBRUARY 1992

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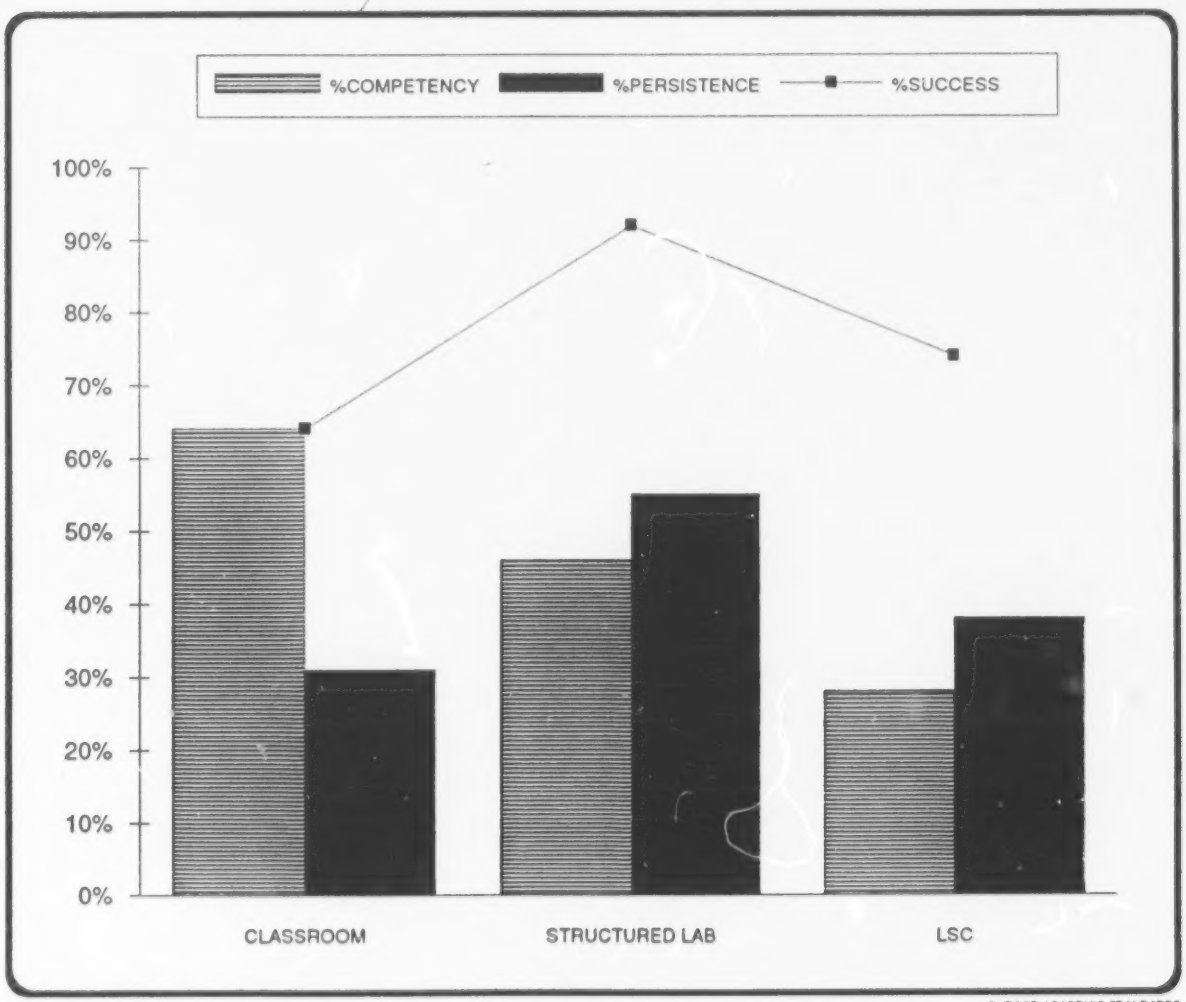

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SJ/ECCD ACADEMIC STANDARDS

DATA HIGHLIGHTS

SUCCESS (ANY # UNITS)	***Structured Lab (Math Lab)***	**92%**
	Learning Skills Center (LSC)	74%
	Classroom	64%
COMPETENCE	***Classroom***	**64%**
	Structured Lab (Math Lab)	46%
	Learning Skills Center (LSC)	28%
PERSISTENCE	***Structured Lab (Math Lab)***	**55%**
	Learning Skills Center (LSC)	38%
	Classroom	31%
NO CREDIT (NC) RATE	***Structured Lab (Math Lab)***	**8%**
	Classroom	14%
	Learning Skills Center (LSC)	25%

COMPARISON OF SUCCESS, COMPETENCY, AND PERSISTENCE RATES OF NEW COLLEGE STUDENTS IN MATH 310 AT SJCC F90 BY METHOD OF INSTRUCTION

INTRODUCTION

Does method of instruction in Math 310 affect success, competency and persistence rates for new college students? Research made possible by a 1990 Title 3 grant provides the following information profiling the type of students enrolled in each instructional setting and their rates of success, competency, and persistence. The three instructional approaches to teaching Math 310 (Arithmetic) are:

1. Traditional 3-unit classroom (CL)

2. Structured Lab (SL)--a math lab offering variable units at a fixed time with one full-time instructor

3. Learning Skills Center (LSC)--a multi-subject, learning center-based approach offering variable units by arrangement

One hundred sixty-three new students starting at SJCC in Fall 1990 were included in this study. Student profiles were developed, data collected, and results tabulated for each of the three methodologies. The questions:

1. Does method of instruction affect persistence?

2. Does first semester competence vary by method of instruction?

3. What are the success rates of the three different approaches?

Definitions:

Persistence = enrolling and succeeding in a course the following semester

Competence = Math Level 1 (allows students to progress to beginning algebra)

Success = A, B, C, or CR grade

SUMMARY STUDENT PROFILE DATA BY METHODOLOGY

	CLASSROOM	MATH LAB	LSC
AGE	50 % 25 - 34	49% <20	51% 20 - 29
ETHNICITY	50% WHITE 28% HSP	36% WHITE 34% HSP	34% WHITE 34% HSP
GENDER	69% FEMALE	55% MALE	60% FEMALE
UNITS ATTEMPTED	100% 3 UNITS	50% 3 UNITS 31% 1 UNIT	49% 1 UNIT
OF THE UNITS COMPLETED	100% 3 UNITS	47% 3 UNITS 32% 1 UNIT	54% 1 UNIT 36% 2 UNITS
NC	14%	8%	25%
INCOMPLETE	19%	0%	0%
SUCCESS	64%	92%	74%
COMPETENCE	64%	46%	28%
PERSISTENCE	31%	55%	38%

PROFILE OF NEW F90 MATH 310 SJCC STUDENTS BY METHODOLOGY

CLASSROOM (CL)

N = 36	AGE	ETHNICITY	GENDER	COMPLETED UNITS	SUCCESS
				N STUDENTS=23	N = 23
	<20 = 11%	ASN = 8%	M = 31%	1 UNIT = 0%	CR = 64%
	20-24 = 25%	BLK = 11%	F = 69%	2 UNITS = 0%	I = 19%
	25-29 = 36%	HSP = 28%		3 UNITS = 100%	NC = 14%
	30-34 = 14%	WHT = 50%			W = 3%
	35+ = 14%	OTH = 3%			

STRUCTURED LAB (SL)

N = 74	AGE	ETHNICITY	GENDER	COMPLETED UNITS	SUCCESS
				N STUDENTS=68	N = 68
	<20 = 49%	ASN = 8%	M = 55%	1 UNIT = 32%	CR = 92%
	20-24 = 22%	BLK = 16%	F = 45%	2 UNITS = 21%	I = 0%
	25-29 = 16%	HSP = 34%		3 UNITS = 47%	NC = 8%
	30-34 = 5%	WHT = 36%			W = 0%
	35+ = 7%	OTH = 5%			

LEARNING SKILLS CENTER (LSC)

N = 53	AGE	ETHNICITY	GENDER	COMPLETED UNITS	SUCCESS
				N STUDENTS=39	N = 39
	<20 = 19%	ASN = 9%	M = 40%	1 UNIT = 54%	CR = 74%
	20-24 = 26%	BLK = 17%	F = 60%	2 UNITS = 36%	I = 0%
	25-29 = 25%	HSP = 34%		3 UNITS = 10%	NC = 25%
	30-34 = 21%	WHT = 34%			W = 2%
	35+ = 9%	OTH = 6%			

TOTAL = 163	AGE	ETHNICITY	GENDER	COMPLETED UNITS	SUCCESS
				N STUDENTS=130	N = 130
	<20 = 31%	ASN = 9%	M = 45%	1 UNIT = 33%	CR = 80%
	20-24 = 24%	BLK = 15%	F = 55%	2 UNITS = 22%	I = 4%
	25-29 = 23%	HSP = 33%		3 UNITS = 45%	NC = 15%
	30-34 = 12%	WHT = 39%			W = 1%
	35+ = 9%	OTH = 5%			

MATH 310 NARRATIVE STUDENT PROFILES

All Math 310 students

Of the Fall 1990 group of 163 students, 78% were under 30 years of age. 39% were White, 33% Hispanic, 5% Other (American Indian, Middle Eastern, & Other). Blacks made up 15 % of the group, and 9% were Asian. 55% of the F90 group were female, 45% male. An impressive 80% successfully completed at least 1/2 unit; 45% reached Math Level 1.

Classroom

Classroom students were in their 20's (61%), and mostly White (50%) or Hispanic (28%). 3% of this group were Other. 69% of these students were female. 64% of them were successful (all at 3 units). 19% (7) of the CL students received Incomplete grades; none of the other students received incomplete.

Structured lab

Nearly half (49%) of the structured lab students were under 20 years old, and 22% of them were between 20 and 24. 70% were White and Hispanic. 55% were male. 92% were successful (47% reached Math Level 1).

Learning Skills Center

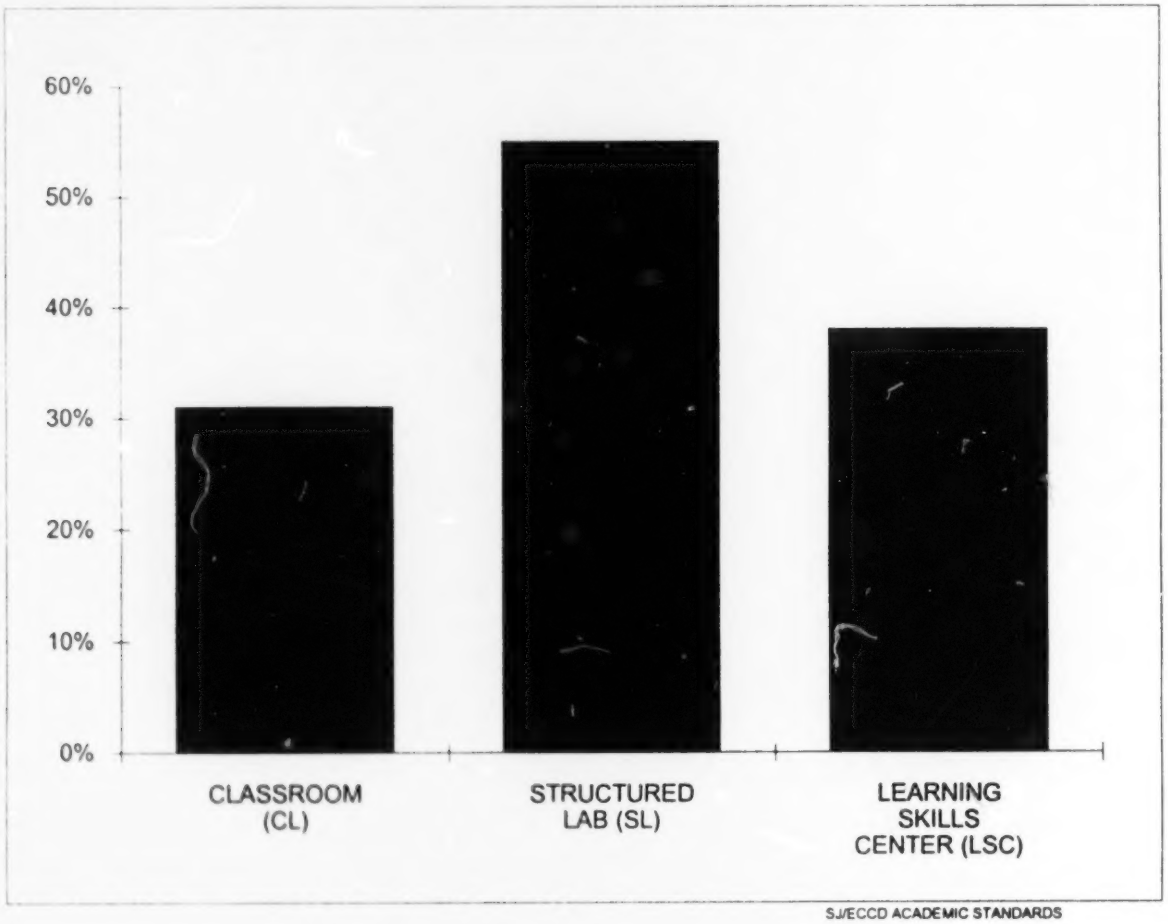
Many of the LSC students have language skills problems. Because this is an open-entry class, some of them started late in the semester. Of those in the LSC setting, 51% were in their 20's, 34% were Hispanic, 34% were White. 60% were female. 74% were successful (but only 10% at 3 units; most students (54%) earned only 1 unit). 25% of these students received No Credit grades, compared to 14% of the CL students and 8% of the SL students.

RESULTS

Question: How does method of instruction in Math 310 affect persistence?

NEW COLLEGE STUDENTS IN MATH 310 F90 SJCC PERSISTENCE BY METHODOLOGY

	#STUDENTS	#PERSISTING S91	%PERSISTING S91
CLASSROOM (CL)	36	11	31%
STRUCTURED LAB (SL)	74	41	55%
LEARNING SKILLS CENTER (LSC)	53	20	38%
TOTAL	163	72	44%

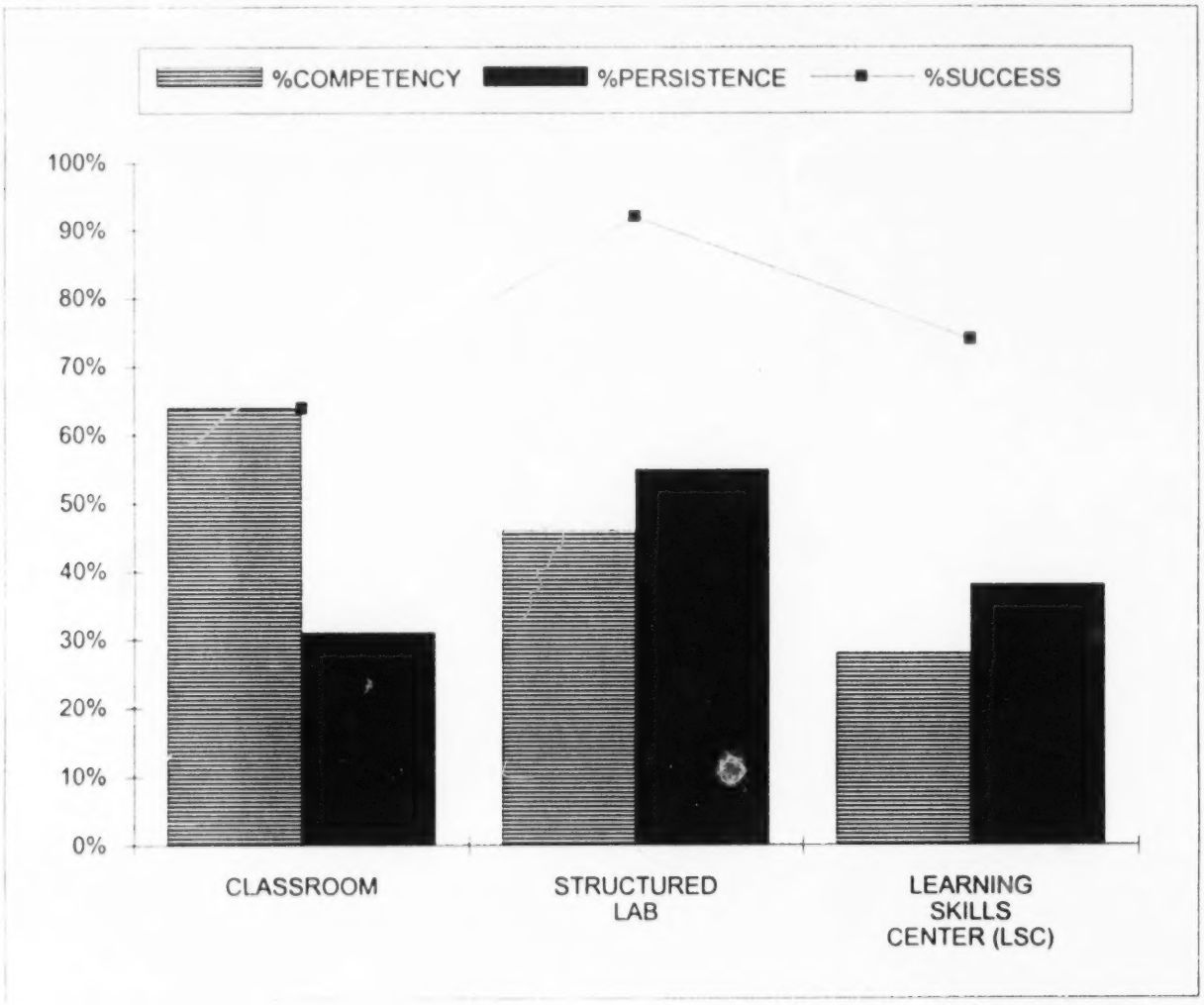


Answer: Students in the structured lab persisted at a 55% rate, while the LSC and classroom had a 38% and 31% persistence rate.

Question: How does first semester competency, success, and persistence to a second semester vary by method of instruction for Math 310 students?

FIRST SEMESTER COMPETENCE, SUCCESS, AND PERSISTENCE OF NEW COLLEGE STUDENTS IN MATH 310 F90 SJCC BY METHODOLOGY

	#STUDENTS	#COMPETENCY	%COMPETENCY	% SUCCESS	%PERSISTENCE
CLASSROOM	36	23	64%	64%	31%
STRUCTURED LAB	74	34	46%	92%	55%
LEARNING SKILLS CENTER (LSC)	53	15	28%	74%	38%
TOTAL	163	72	44%	80%	44%



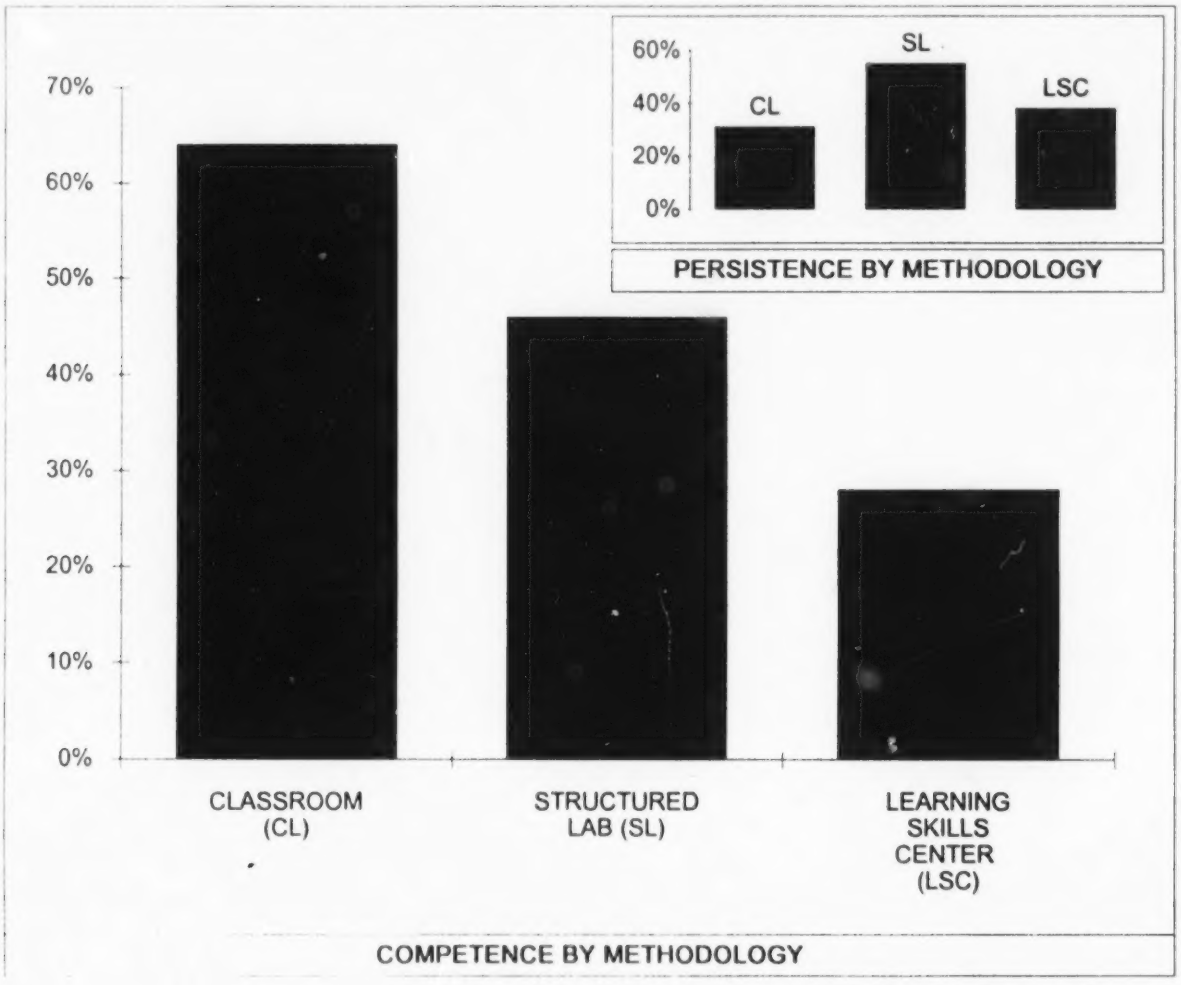
SJECCD ACADEMIC STANDARDS

Answer: The structured lab had the highest combination of success and persistence at 92% and 55%. The classroom had the highest combination of success and competency at 64% each, but had relatively low persistence. The LSC had a high success rate but low competency and persistence.

Question: How does reaching competency in Math 310 vary by method of instruction?

NEW COLLEGE STUDENTS IN MATH 310 F90 SJCC COMPETENCE BY METHODOLOGY

	#STUDENTS	#COMPETENCY F90	%COMPETENCY F 90
CLASSROOM (CL)	36	23	64%
STRUCTURED LAB (SL)	74	34	46%
LEARNING SKILLS CENTER (LSC)	53	15	28%
TOTAL	163	72	44%



SJ/ECCD ACADEMIC STANDARDS

Answer: 64% of the classroom students reached competency compared to 46% for the structured lab and 28% for the LSC.

DISCUSSION AND RECOMMENDATIONS

The Classroom

This is a variable unit course that was offered for a fixed 3 units in the sections studied in this report. Fifty percent of the students were ages 25 - 34, the ethnic composition was 50% White and 28% Hispanic, and a there was a very high (69%) Female population. It was taught primarily by part-timers without clear guidelines for establishing exit standards or texts.

It had the advantage of a familiar classroom format, had a moderately high success rate at 64%, the highest competency rate at 64%, a low persistence rate of 31%, and a high incomplete rate at 19%.

Students who didn't reach competency either failed (14% NC), got an Incomplete (19%) or withdrew (3%).

Recommendations

Four areas could be addressed for the benefit of students.

1. The classroom could be taught as variable unit (1 -3 units, for example). The students currently getting I or NC grades could be given 1 or 2 units of success grades and finish up their third unit in the structured lab or in the LSC.

2. An in-class counseling/advisement program could be introduced to assist students in planning for the next semester in order to increase the current low persistence rate.

3. The exit process, text, and materials chosen by the full-time faculty could be required for the part-timers teaching the classroom.

4. Develop an advisement brochure related to math courses and methods of instruction.

Structured Lab

The structured lab has several advantages. It has high structure, a very, very high success rate (92%) so that underprepared students do not leave with a failure experience. A moderate competency rate (46%) means students can move on to Math 12 and other college courses requiring Math 310.

Students are motivated to return the following semester with a 55% persistence rate.

The lab allows a student to complete fewer than three units and still succeed.

The student profile of the structured lab shows 49% of the students under 20, while classroom students tend to be older--61% were between the ages of 20-29.

36% of the students in the structured lab were White; 34% were Hispanic. There are more males in this group, at 55%, than in the classroom or LSC setting.

Recommendations

Two areas could be addressed for the benefit of students.

1. An in-class counseling/advisement component could be of help in encouraging and assisting students to persist the following semester and in helping the student to re-enroll in Math 310 to achieve competency.

2. Develop an advisement brochure related to math courses and method of instruction.

Learning Skills Center (LSC)

Half of the Math 310 students in the learning skills center lab were between 20 and 29 years of age. 34% were White, a lower rate than the classroom or structured lab. 34% were Hispanic, and there were more Females (60%) than Males.

While the success rate was high at 74%, so was the NC rate at 25%. This initial success does not seem to lead to competency (28%) or persistence (38%). Compared to the Classroom and Structured Lab, the LSC has a very low staff to student ratio and a very low full-time certificated staff.

Recommendations

Clarify and sharpen the role of the LSC in math instruction. The following objectives are presented for consideration along with recommendations from the 1990 - 1991 LSC program review:

1. To help the classroom students with incompletes make up their "I" grades. (Preferably the classroom should give 1- 3 units of credit just as the structured lab does. The remaining units could then be made up in the LSC or structured lab.)

2. To help students in the fixed-time classroom to finish their class at a more convenient time if they are dropping the class due to time conflicts.

3. To serve the student who has no educational goal beyond brushing up on arithmetic. The LSC developmental studies courses, in general, provide a learning alternative for students who: a.) demonstrate limited competency in a course and need essential skills for a specific purpose, such as to complete credits for high school graduation or to prepare for a work-related goal or examination; b.) require one-to-one instruction due to anxiety, learning disabilities, communications disabilities, physical disabilities, acquired brain injuries, and developmental disabilities; c.) enter college too late to join a classroom section yet want to prepare for the next full semester; d.) are attending school for personal enrichment and choose the flexibility of a schedule-by arrangement, variable credit, and open entry-open exit.

4. Develop an advisement brochure related to math courses and method of instruction.

5. Develop a Math 310L (Lab) program related directly to the M310 offerings. Consider having the full-time Math 310 instructors spend part of their time in the lab to follow up on these students.

Appendix A: RANKING BY METHODOLOGY

If the three methodologies were ranked on several important indicators, they would appear as follows:

	SUCCESS (any # of units)	COMPETENCE	PERSISTENCE	LOW NC RATE	LOW W RATE	LOW I RATE
SL Rank	1	2	1	1	1	1
CL Rank	3	1	3	2	3	3
LSC Rank	2	3	2	3	2	1

SL = Structured Lab CL = Classroom LSC = Learning Skills Center

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